

DB2 Everyplace V7.2.1 -

Mobile and Embedded Database
and Synchronization Architecture

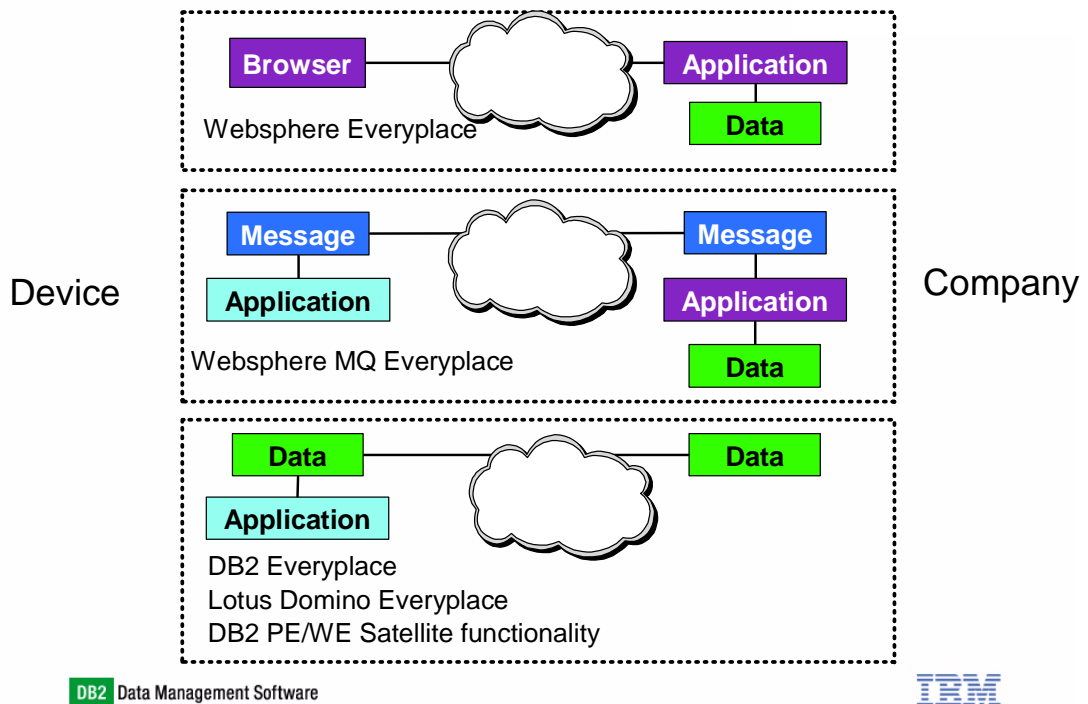
Joachim Stumpf
DB2 Technical sales support

IBM Software Group

Agenda

- Introduction
- Reference scenarios
- Components
- Database functions and features
- Sync architecture
- Administration
- Application development
- Information sources

IBM Mobile solutions-- technical overview



Things to think about.....

✓ Why a relational database versus a flat file

- API's
- easier application development
- Replication of data with backend sources
- relational capabilities

DB2 Evolution

- ▶ Universal Access
- ▶ Universal Application
- ▶ Universal Extensibility
- ▶ Universal Scalability
- ▶ Universal Reliability
- ▶ Universal Management

7.2

7

- Integrated Warehousing
- Integrated OLAP
- Federated databases
- Native OLE DB client
- XML extender
- Spatial extender
- Abstract Data Types
- SQL stored procedures

6

- DB2 for Linux
- DB2 Satellite Edition
- Ease of use
- Ease of application development
- Performance

5

- SMP and MPP parallelism
- Data Links Manager
- SQLJ
- Initial OLAP SQL

2

- Multiple platforms
- Capacity and performance
- JDBC
- UDTs, UDFs, LOBs

- OS/2 and AIX platform
- Low-end OLTP

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- DB2 Everyplace new platforms
- High Availability enhancements
- LINUX coverage and scalability
- Very large memory exploitation
- WebSphere integration
- Relational Connect Improvements
- Improved migration paths from Oracle, SQL Server, and Informix
- Warehouse and Content Management improvements



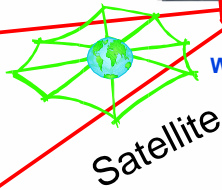
IBM DB2 Family

DB2

- Universal Access
- Universal Application
- Universal Extensibility
- Universal Scalability
- Universal Reliability
- Universal Management

Everyplace

- Palm OS
- Win CE/PocketPC
- EPOC R5
- Symbian OS 6
- QNX Neutrino
- embedded Linux
- Linux
- Win 32 (9x, NT, 2000)



Satellite

- OS/2
- Win 95, 98
- Win NT/2000
- Linux

DB2 Connect



Enterprise

- OS/2, Win NT/2000
- AIX, HP-UX, Solaris
- Linux, NUMA-Q

Enterprise - Extended

- AIX
- Linux
- Win NT/2000
- Solaris
- HP-UX
- NUMA-Q



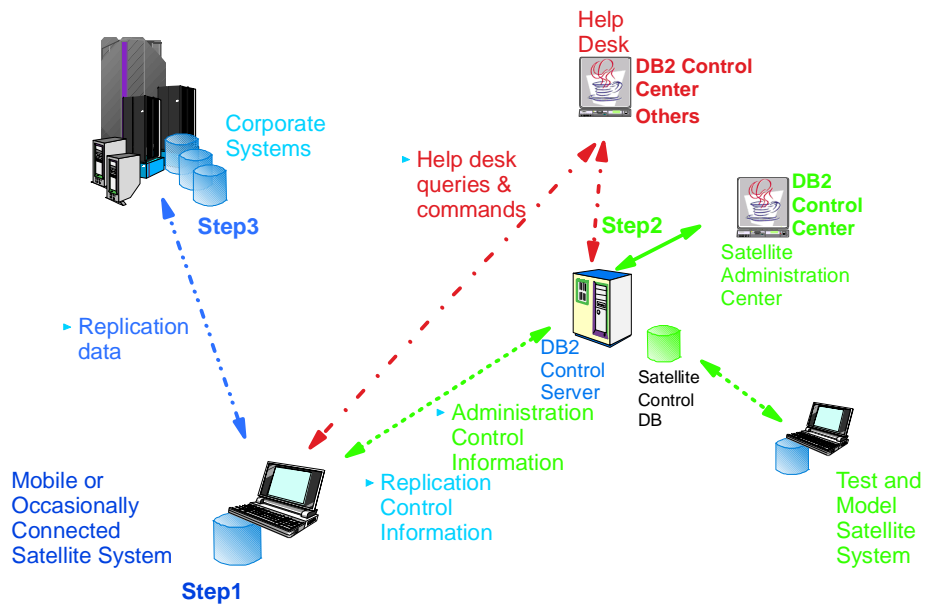
Hosts

- DB2 UDB for OS/390
- DB2 for VSE & VM
- DB2 UDB for AS/400

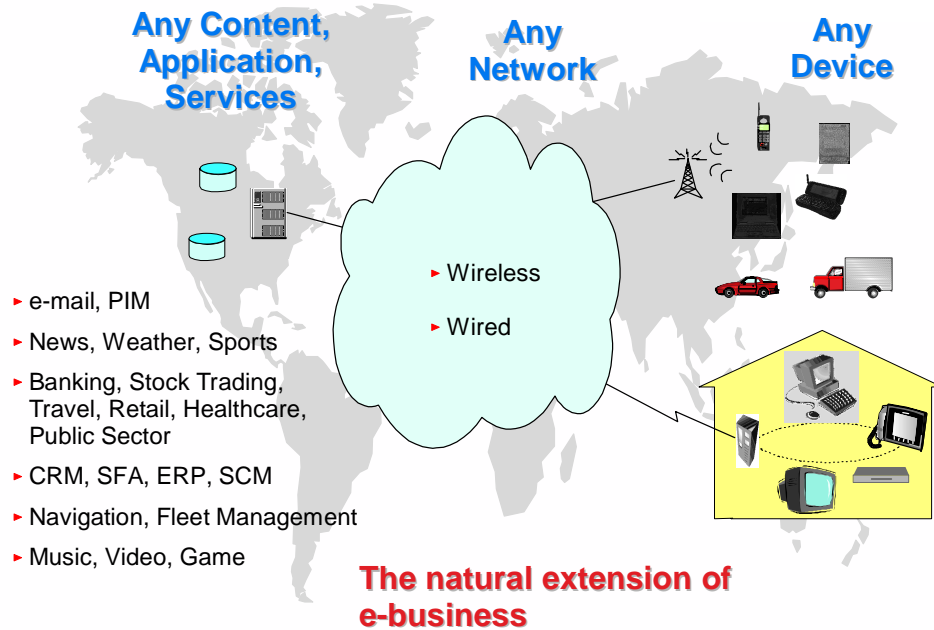
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DB2 Satellite scenario



IBM Pervasive Computing Vision



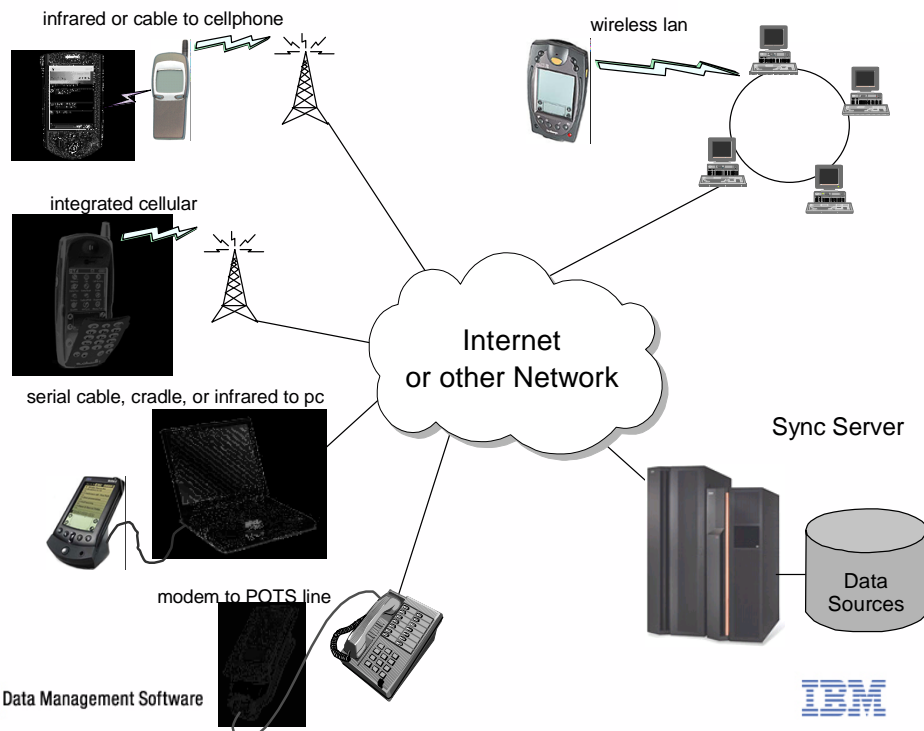
DB2 Everyplace __ WHY??

- increase employee productivity
- increase customer satisfaction
- improve business operations with up to date information
 - ✓ Field force automation, insurance, healthcare, retail, financial services

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DB2 Everyplace Sync connection options



Business applications

> Business to Employee Productivity

- > Field Force Automation
 - > Customer and product information
 - > Barcode and part information from scanning devices
 - > Insurance policy information
 - > Auditing information for quality and safety applications
 - > Monitoring of system information



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Business applications

> Industries - Customer Relationship Management

- > Insurance - policy information, pricing information
- > Healthcare - Nurses, healthcare professionals
- > Education - student information for teachers
- > Distribution - inventory tracking
- > Telecommunications - auditing of telecommunications sites
- > Finance - mobile banking
- > Government - Social Services, Policy enforcement
- > Retail - point-of-sale automation for retail chains, kiosks



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ISVs and partners

- DB2 Everyplace and Pervasive Computing efforts in DM follow the overall DM ISV strategy.

Current partners:

▶ **SIEBEL** - Siebel 7 Sales Handheld for Palm OS

▶  - RiverRun creates integrated PvC solutions

▶ **PEOPLE
Soft**

"PeopleSoft will leverage DB2 Everyplace as the local data store for PeopleSoft's mobile applications. With a small footprint and its robust functionality, DB2 Everyplace provides a foundation for functionally rich mobile applications that can be quickly deployed to the end user."

"Leveraging DB2 Everyplace as the local data store device with PeopleSoft's pure internet data sync technology will enable mobile professionals to access and sync data at their convenience," said Janet Perna, general manager of IBM Data Management Solutions. "The combination of DB2 Everyplace and PeopleSoft's new mobile technology will empower PeopleSoft 8 customers with real-time information in mobile environments."

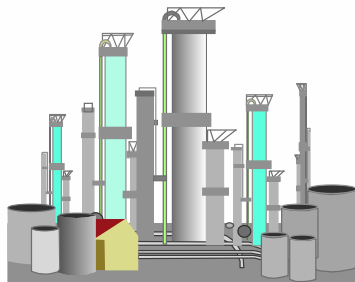
http://www.peoplesoft.com/conf/connect/1pla_4.html

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Field Force Automation: Gas de France

- IBM Global Services and Gas de France created a mobile gas meter reader application
- Deployed to 700 field engineers using Palm OS devices to monitor customer gas meters
- Uses the DB2 Everyplace Sync Server to synchronize with existing DB2 infrastructure
- Integrated with their Tivoli management environment



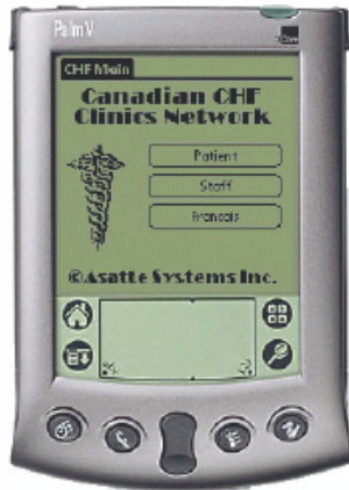
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Healthcare: Asatte





- Healthcare - Mobile Patient Record Management System used in clinics
- Patient Info is downloaded each a.m; updated and supplemented each day; uploaded to main database each p.m.
 - ▶ benefits of reduced input errors, saves staff time entering doctor information
- Information is generic (weight, bp, etc) and then customized per clinical speciality allowing for data collection and compilation
 - ▶ leads to best practices
 - ▶ helps in study participation



Asset Tracking: Essential Systems



- Asset Tracking Application

■ DB2E database UDB on Palm  DB2E sync server on Linux  DB2 on Linux



1. Worker A takes tool.
2. Worker B scans bar code of tool & worker.
3. Information reconciled with corporate accounting, inventory and employee systems

Benefits:

- ✓ Tools and Tool status tracked
- ✓ Tool use can now be billed per job

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Retail/Sales Force Automation: NetSet



- Sales Force Automation Application tied in with retail store point of sale and Lawson accounting system
- DB2E database on WinCE/ Compaq IPAQ
- DB2E sync server on WinNT
- DB2 UDB on AS/400



1. Salesperson takes order and verifies item in stock; 76,000 SKUs to choose from.
2. Order forwarded from immediate fulfillment

✓ **Benefits:** Fewer errors, Faster delivery, Sales productivity

DB2 Data Management Software



Retail/Easy of Use: Penn State



- Penn State Center for Advanced Information Technology
- Used DB2 Everyplace in second year college class - students created a 'store' that can be accessed from a Palm device to order or check order status
- Use DB2 Everyplace on Palm OS; Sync Server on NT
- "We were amazed that DB2 Everyplace was a full function database, yet had a small footprint and ran on an handheld device...And the Mobile Application Builder was fantastic - led students through a point and click programming process and automatically created the C code for the Palm..."

DB2 Data Management Software



System Monitoring/Embedded: X-Serwis



- Solution based on DB2 Everyplace running on embedded x86 hardware and QNX Neutrino
- X-Serwis created a Weather reporting system based on European Union standards.
- Required robustness and reliability for continuous operation in remote locations.
- Benefit
 - ▶ 100% ROI in one year
 - ▶ annual savings of US\$1.5 million in road maintenance costs
 - ▶ more cost-effective road maintenance resulting from accurate evaluation of icy road conditions
 - ▶ improved driving safety

“Using IBM DB2 Everyplace databases in 12 remote weather monitoring stations around the city, the Warsaw Road Maintenance authority knows just where to send crews to clear the roads of ice and snow, and can act quickly.”

DB2 Data Management Software

Jaroslaw Luczak
Managing Director, X-Serwis



DB2 Everyplace

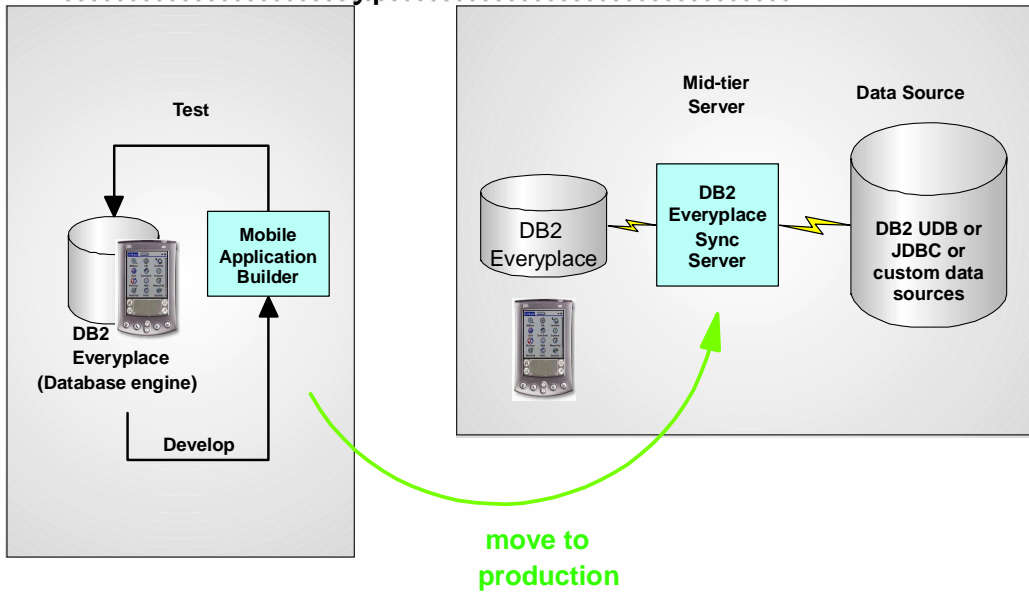
DB2 Everyplace is a small footprint relational database and synchronization server for mobile computing and embedded devices.

Component Name	Description
DB2 Everyplace Database	Database Engine Stores and processes data on mobile and embedded devices
DB2 Everyplace Sync Server	Synchronization Server Synchronizes data between devices and enterprise data sources
DB2 Everyplace Mobile Application Builder	Application Development Tool Allows rapid application development for Palm OS platform

DB2 Data Management Software



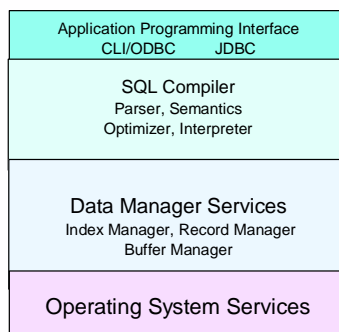
The DB2 Everyplace Solution



DB2 Data Management Software



DB2 Everyplace Architecture



System Tables:
DB2eSYSTABLES
DB2eSYSCOLUMNS
DB2eSYSRELS



User Tables

DB2 Data Management Software



DB2 Everyplace Characteristics

- RDBMS especially made for mobile devices and embedded systems
- API's
 - ▶ DB2 Call Level Interface (CLI) / ODBC subset
 - ▶ A set of C/C++ function can be called in programs to access the database
 - ▶ JDBC and Java application support
- DBCS (double byte character set) and NLV support
- Encryption (communication)
- ~~Read-Only media support on Win32~~
- IBM Microdrive and Compact Flash Memory support



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DB2 Everyplace SQL

- Supports a subset of SQL
 - ▶ CALL procedure
 - ▶ CREATE INDEX (asc/desc) bidirectional
 - ▶ CREATE TABLE
 - ▶ DROP TABLE/INDEX
 - ▶ [ONLINE Reorg](#)
 - automatic reorganization of database to reclaim deleted rows and clean up the database
 - ▶ EXPLAIN
 - ▶ INSERT with subselects and default values
 - ▶ DELETE
 - ▶ UPDATE (records)
 - ▶ SELECT (records) with
 - JOIN (up to 8 tables)
 - GROUP BY
 - ORDER BY (asc/desc)
 - LIMIT (integer) for result set
 - ▶ IN predicate
 - ▶ scrollable cursors
 - ▶ [Basic transaction support](#)

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DB2 Everyplace Characteristics

- CREATE TABLE
 - ▶ with following datatypes
 - INTEGER
 - SMALLINT
 - DECIMAL (Big)
 - CHARACTER(Smallint)
 - VARCHAR(Smallint)
 - BLOB(Smallint)
 - DATE
 - TIME
 - TIMESTAMP
 - ▶ and options
 - PRIMARY KEY with more than one column
 - referential constraints
 - CHECK constraints



CREATE TABLE

.....

- create table ORDERS
 - (CUSTNO CHAR(6) NOT NULL,
ENTRY TIMESTAMP NOT NULL DEFAULT Current Timestamp,
 - ITEM CHAR(15) ,
PRICE DECIMAL(9,2),
 - Check (Price < 100),
 - PRIMARY KEY (CUSTNO,ENTRY))

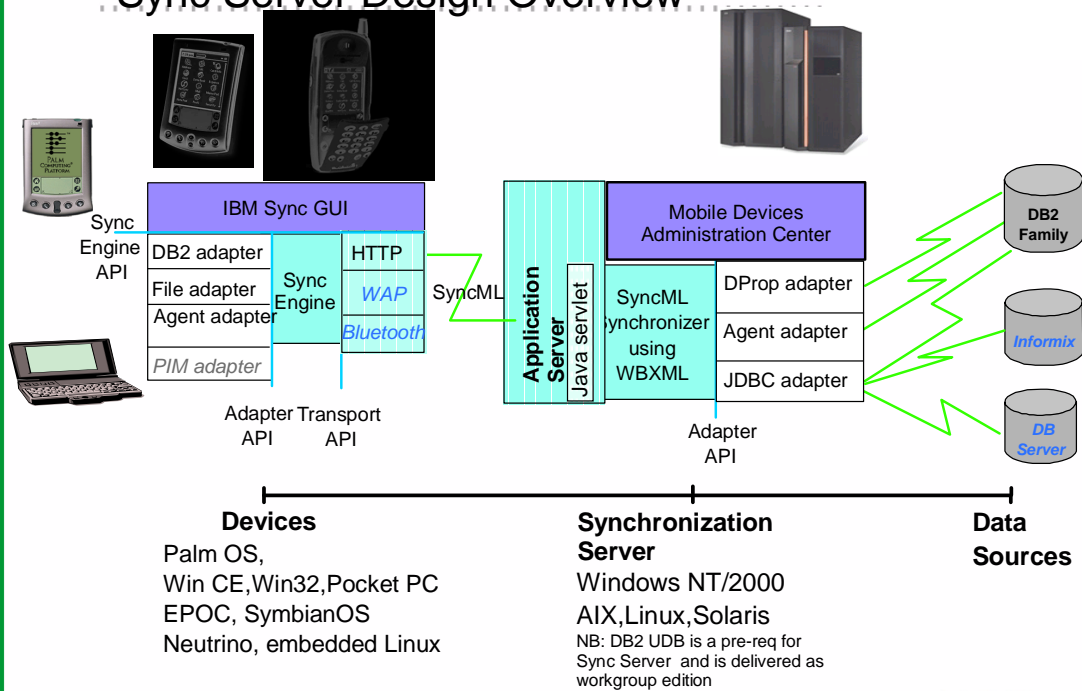
DB2 Everyplace Functions

- Functions supported
 - ▶ **AVG**(expression)
 - ▶ **SUM**(expression)
 - ▶ **MIN**(expression)
 - ▶ **MAX** (expression)
 - ▶ **COUNT**(expression)
 - ▶ **CONCAT**(expression,expression)
 - ▶ **MOD**(expression,expression)
 - ▶ **LENGTH**(expression)
 - ▶ **RTRIM**(expression)
- expression can be
 - ▶ a literal like *
 - ▶ column name , function , special register

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Sync Server Design Overview

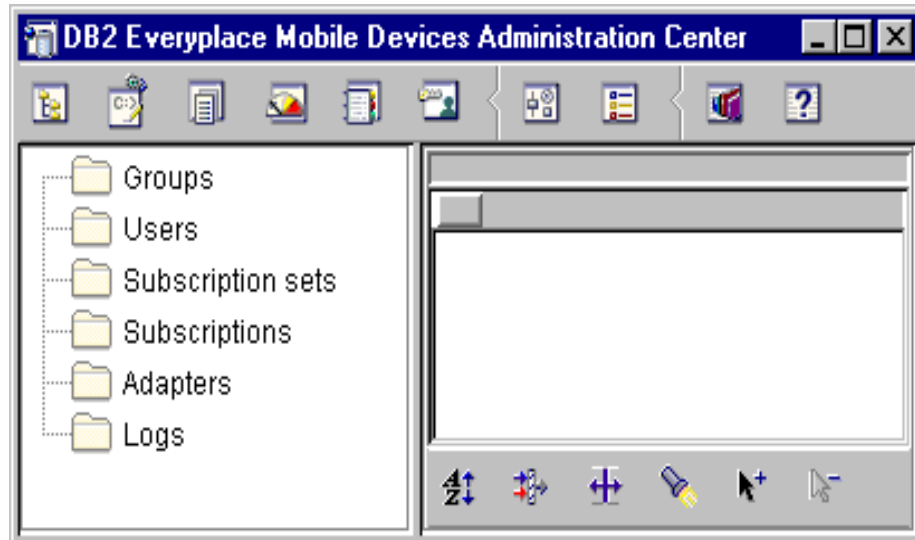


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Mobile device administration center

- MDAC is the tool to define all these object properties

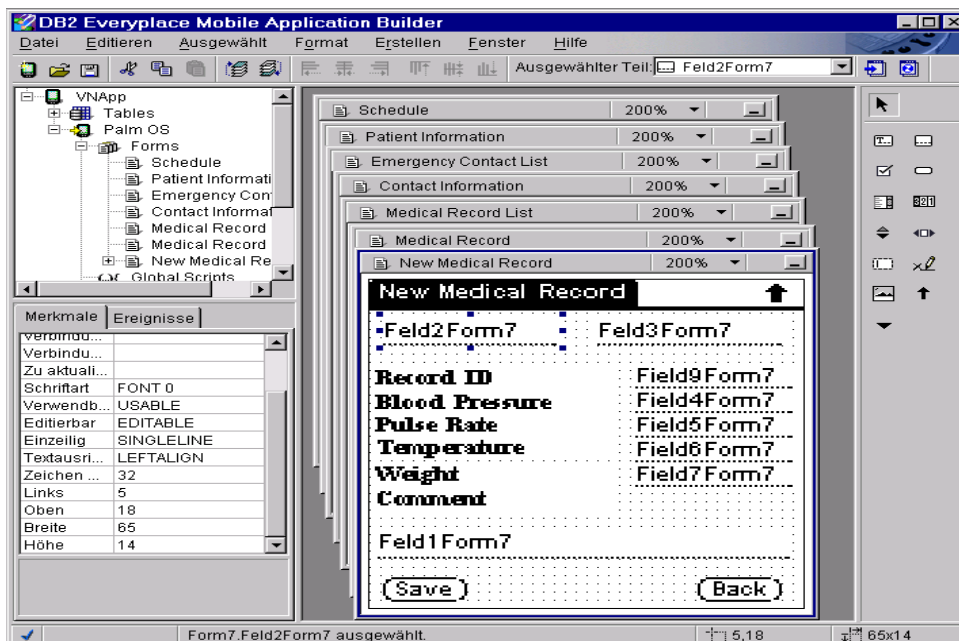


DB2 Data Management Software



DB2 Everyplace Mobile application builder

- Enables **rapid application prototyping** and development on Palm OS without writing a single line of code.
- Includes DB2 Everyplace sample applications (source code & project file)



Robust Development environment

- Programming interfaces supported
 - ▶ DB2 Call Level Interface (CLI) / ODBC subset
 - ▶ Java DataBase Connectivity (JDBC) driver for Java applications
 - ▶ Visual Basic Interface for Win32, WinCE/PocketPC application development
- Included Developer tools
 - ▶ Database Import and Export utilities
 - ▶ Command Line Processor for all platforms
 - ▶ Sample applications with full source C/C++ code
 - ▶ Mobile Application Builder for Palm OS available free from website
- Commercial Development tools
 - ▶ Metrowerks CodeWarrior - <http://www.metrowerks.com/platforms/>
 - Supports Palm OS, JAVA and QNX Neutrino
 - ▶ Microsoft Visual Studio - <http://msdn.microsoft.com/cetools/>
 - Supports Windows Embedded Visual Tools 3.0
 - ▶ Visual Age MicroEdition from OTI - <http://www.embedded.oti.com>
 - Supports JAVA on Palm OS, QNX Neutrino, and embedded Linux



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Robust Development environment

- Commercial Development tools (cont'd)
 - ▶ Software Development Kits
 - Palm OS SDK
 - EPOC R5, Symbian 6
 - Lineo Embedix SDK (embedded Linux)
 - Lynuxworks Lynux SDK (embedded Linux)
 - QNX Neutrino 2.0 SDK

DB2 Data Management Software



References/resources

- DB2 Everyplace website
 - ▶ <http://www.ibm.com/software/data/db2/everyplace>
- developer forum
 - ▶ <http://www.developer.ibm.com>
- redbooks (<http://www.redbooks.ibm.com>)
 - ▶ SG24-6217-00 IBM Replication Solutions for Pervasive Computing
- DB2 magazine
 - ▶ http://www.db2mag.com/db_area/archives/2001/q4/zikopoulos.shtml
- DB2 Everyplace db2everyplace@yahoogroups.com
 - ▶ To subscribe go to
 - <http://groups.yahoo.com/group/db2everyplace>
- Documentation
 - ▶ Installation and User Guide manual
 - ▶ Application Development Guide manual
 - ▶ Sync server administration guide
- Schulung
 - ▶ Kurs 'CG20EDE' <http://www.ibm.com/de/learning/>

The End



Packaging & Pricing - 7.2.1

Package	Components Included	Price
DB2 Everyplace Database Edition	Database	€63 (US) per registered user
DB2 Everyplace Enterprise Edition	Database Sync Server	€12,608 per server processor + €94 per registered user
DB2 Everyplace Mobile Application Builder	Mobile Application Builder	Free Download off the Web

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